ISSN NO. 2320-5407

Journal homepage: http://www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH

RESEARCH ARTICLE

RELATIONSHIP BETWEEN DERMATOGLYPHICS, CHILOSCOPY AND DENTAL CARIES AMONG DENTAL STUDENTS OF VISNAGAR TOWN, GUJARAT.

Dr. Madhusudan. K[1], Dr. Hiren P. Patel[2], Dr. Umesh. K[3], Dr. Sangeeta Chavan[4], Dr. Rahul Patel[5], Dr. Rajesh Patel[6], Dr. Niraj Gadhavi[7].

1. Prof. and Head Department of Public Health Dentistry Narsinhbhai Patel Dental College & Hospital, Visnagar
2. Post graduate student, Department of Public Health Dentistry Narsinhbhai Patel Dental College & Hospital, Visnagar
3. Reader Department of Public Health Dentistry Narsinhbhai Patel Dental College & Hospital, Visnagar
4. Reader Department of Public Health Dentistry Narsinhbhai Patel Dental College & Hospital, Visnagar
5. Sr. Lecturer Department of Public Health Dentistry Narsinhbhai Patel Dental College & Hospital, Visnagar
6. Post graduate student, Department of Public Health Dentistry Narsinhbhai Patel Dental College & Hospital, Visnagar
7. BDS, Narsinhbhai Patel Dental College & Hospital, Visnagar.

Manuscript Info

Manuscript History:

Received: 14 May 2015
Final Accepted: 29 June 2015
Published Online: July 2015

Key words:

Dental caries, Dermatoglyphics, Cheiloscopy

Corresponding Author

Dr. Hiren P. Patel

Abstract

Introduction: Dental caries has a high prevalence worldwide. Its aetiology is complex, however the question of a possible true genetic predisposition toward dental caries has piqued the minds of dental investigators for decades as lip, and thumb and the tooth enamel are derivatives of embryonic ectoderm.

Aim and Objective: A study was conducted to assess if any relationship can be established between thumb print patterns, lip print patterns with dental caries respectively.

Methodology: A Descriptive, cross-sectional study was conducted among 233 dental students of Narsinhbhai Patel Dental College and Hospital, Visnagar, North Gujarat. Dental caries of students was recorded by using DMFT index. Thumb print and lip print of the students was recorded on bond paper and analyzed by Cummins method and Tsuchihashi's classification respectively.

Results: Prevalence of dental caries was higher among subjects with loop pattern (67.0%) compared to other thumb print patterns. Prevalence of dental caries was higher among subjects with branched groove pattern (71.3%) compared to other lip print patterns.

Conclusion: Use of Dermatoglyphics and Cheiloscopy to predict the genetical basis of dental caries are still an inexact science at the present time. Further extensive research in this field has to be done in order to determine and evaluate the significance of this variation.

INTRODUCTION

Individual identification is an important and challenging task in forensic investigation which was based on scientific principles. A lip print is different in every living individual and does not change with time therefore it can be used as a tool in forensic investigations. Tsuchihashi's **[1]** and Suzuki **[2]** established that the arrangement of lines on the red

part of the human lip is individual and unique. In 1981, Cottone reported cheiloscopy as a special technique for the purpose of individual identification **[3]**. It has been confirmed that these furrows recover after undergoing alterations like trauma and inflammation and disease like herpes. Also the disposition and form of the furrows does not change with environmental factors **[4]**.

The term "fingerprint" predominantly means an impression of the epidermal ridges of the fleshy distal portion of a finger formed by applying ink and pressing the finger on paper and is used as means of establishing identification **[5]**. Study of finger prints is known as Dermatoglyphics **[6]**. The word Dermatoglyphics was coined by Cummins and Midlo in 1926 meaning dermi=skin and glyphe= curve **[7]**.

In Contrast to any other oral disease like periodontal disease, Dental caries has a high prevalence worldwide. Its etiology is complex and multi factorial; however the question of a possible true genetic predisposition toward dental caries has piqued the minds of dental investigators for decades **[8, 9]**. The basis of considering thumb print patterns and lip print patterns as genetic marker for dental caries as each of them have a ectodermal origin. As per our knowledge this is the first study to explore the relationship of various patterns of thumb print, lip print and dental caries respectively hence the present study was conducted to assess the relationship of lip print, thumb print and dental caries among dental students of Narsinhbhai Patel Dental College and Hospital, Visnagar, Gujarat, India.

MATERIALS AND METHOD:

It is a Descriptive, cross-sectional study conducted on 233 students of Narsinhbhai Patel Dental College and Hospital, Visnagar, North Gujarat. Prior information of the study was given to all students verbally and informed consent was taken. For collection of data Performa was used which consist of demographic detail, box for lip print, thumb print, and recording format of DMFT index. For recording of thumb print and lip print help of other examiners taken who were trained and calibrated. Oral examination for recording of DMFT index for dental caries was done by author himself.

Inclusion criteria: volunteering healthy individuals were included in the study

Exclusion criteria: Those students who having any developmental anomaly or any pathology on lips and fingers, absent on the day of examination, did not give informed consent and those students who were allergic to lip stick, ink pad and cellophane tape were excluded from the study.

Procedure of Lip print recording;

The lips of the subjects were cleaned and a lipstick was applied evenly over the vermillion border of the lip and subjects were asked to rub both the lips to spread the applied lipstick uniformly. After 1 minute, the glued portion of the cellophane tape was placed over the lipstick. The lip prints were taken in the normal rest position by dabbing cellophane tape in the centre first and then pressing it comfortably toward the corners of the lips. The cellophane strip was then stuck to the white bond paper for a permanent record. The lip prints were then analyzed following Tsuchihashi's classification **[10]** using a magnifying glass.

Procedure for Thumb print recording ;

The left hand thumb was cleaned and thumb was pressed on the blue ink stamp pad with gentle pressure followed by placing of the thumb on the white bond paper to take impression. The prints were examined using magnifying glass, classified, and analyzed by Cummins method of Finger print identification **[11]**.

Dental caries was recorded by using probe and mirror and caries experience of students was measured by using DMFT index **[12]**. The oral examination of all the students was done on the dental chair by author himself.

Statistical Analysis:

The collected data was entered in to Microsoft excel 2007 and subjected to statistical analysis using Statistical package for Social Sciences (SPSS version 17.0). The results were evaluated by Pearson's correlation coefficient tests.

RESULTS:

The present study was carried out to assess the correlation between various patterns of lip print, thumb print with dental caries respectively.

Total of 233 dental students were included in the study out of which 50 males (21.45%) & 183 (78.54%) females. The mean age of subjects was 19.60 ± 1.54 years. Among all, the loop pattern (41.63%) was most commonly found in the study subjects. Where as in the lip patterns, branched groove pattern (34.33%) was most commonly found in study subjects. (Table - 1)

Table 2 shows statistically non significant correlation between various patterns of thumb print and dental caries, p value (0.725). Prevalence of dental caries was higher among subjects with loop pattern (67.0%) compared to other thumb print patterns. Whereas the subjects with arch pattern (41.7%) shows lowest prevalence of dental caries.
Table 3 shows statistically non significant correlation between various patterns of lip print and dental caries, p value (0.235). Prevalence of dental caries was higher among subjects with branched groove pattern (71.3%) compared to other lip print patterns. whereas the subjects with undifferentiated groove pattern (50.0%) shows lowest prevalence of dental caries.
Table 4 shows no relationship between gender and thumb print. In male, prevalence of loop pattern (50%) was higher compare to other patterns .where as in females, prevalence of loop and whorl pattern (39.34%) was higher compare to arch pattern.
Table 5 shows no relationship between gender and lip print. In both gender, prevalence of branched groove pattern [male (42%), female (32.24%)] was higher compare to other lip print patterns.

Table 1. Descriptive data of the study population

Mean age	19.60
GENDER DISTRIBUTION	
Male	21.45%
Female	78.54%
THUMB PATTERNS	
Loop pattern	41.63%
Arch pattern	20.60%
Whorl pattern	37.76%
LIP PATTERNS	
Complete straight groove	15.87%
Partial straight groove	20.60%
Branched groove	34.33%
Intersected groove	5.15%
Reticular groove	11.15%
Undifferentiated groove	12.87%

Table 2. Relationship between the Thumb print and Dental caries

Thumb patterns	Dental caries		Coefficient of correlation	P value
	Present	Absent		
Loop pattern	67.0%	33.0%	-0.023	0.725
Arch pattern	58.3%	41.7%		
Whorl pattern	64.8%	35.2%		

Table 3. Relationship between Lip print and Dental caries

Lip patterns	Dental caries		Coefficient of correlation	P value
	Present	Absent		
Complete straight groove	67.6%	32.4%	-0.078	0.235
Partial straight groove	62.5%	37.5%		
Branched groove	71.3%	28.8%		
Intersected groove	66.7%	33.3%		
Reticular groove	57.7%	42.3%		
Undifferentiated groove	50.0%	50.0%		

Table-4; Relationship between Gender and Thumb print

Thumb print	Gender	
	Male	Female
Loop pattern	25(50%)	72 (39.34%)
Arch pattern	9 (18%)	39 (21.31%)
Whorl pattern	16 (32%)	72 (39.34%)
Total	50 (100%)	183 (100%)

Table- 5; Relationship between Gender and Lip print

Lip print	Gender	
	Male	Female
Complete straight groove	9 (18%)	28 (15.30%)
Partial straight groove	5 (10%)	43 (23.49%)
Branched groove	21 (42%)	59 (32.24%)
Intersected groove	2 (4%)	10 (5.46%)
Reticular groove	7 (14%)	19 (10.38%)
Undifferentiated groove	6 (12%)	24 (13.11%)
Total	50 (100%)	183 (100%)

LIP PRINT PATTERN RECORDING PROCEDURE

1. Application of lip stick

2. Application of cellophane tape

3. Stick on bond paper

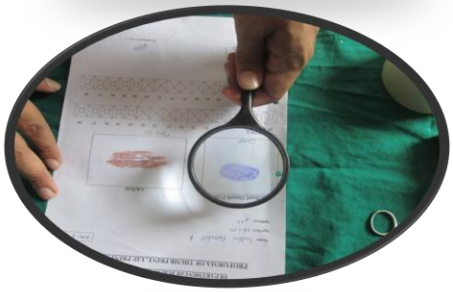
4. Analysis of lip print

THUMB PRINT PATTERN RECORDING PROCEDURE

1.Wash the hand

2.Pressing the thumb on stamp pad

3.Recording of thumb print



4.Analysis of thumb print

RECORDING OF DMFT INDEX

DISCUSSION:

Dental caries is a microbial disease of the calcified tissue of the teeth, characterized by demineralization of the organic portion and destruction of the organic substance of the tooth. Dental caries is a disease of the childhood and it unequally distributed in the population. Dental caries is a chronic, complex, multifactorial disease for which a multitude of etiologies like host and environmental factors have been proposed **[13]**. The relative roles of hereditary and environmental (nature v nurture) in the pathogenesis of dental caries has intrigued clinical and basic researchers for decades. There are numerous host resistance and risk factors for dental caries that are genetically determined **[14]**. It is critical to realize that genes and environment do not act independently of each other and the appearance or magnitude of heritability may differ with various environments.

Genetic variation in the host factors contributes to increase risks for dental caries. Environmental factors, such as diet, oral hygiene habits also play a large role in causing dental caries.

For ages, the features of the hands fascinated scholars, sages, theologians, doctors, and laymen alike. The modern study of the hand is far removed from the popular image of the traditional palmist uttwring mysterious incantations in an arcane language. rather, through decades of scientific research, the hand has come to be recognized as a powerful tool in the diagnosis of psychological, medical and genetic conditions **[15]**. The Dermatoglyphics patterns have been used as an oral health marker, which can determine the genetic predisposition of individual to dental caries **[16]**.

The use of lip prints is not so popular but exists as a methodology in forensic science. The grooves present on the human lips are unique to each person and can be used to determine identity. Studying in depth and establishing further facts and truth in lip print will certainly help us, as useful evidence in forensic science **[17]**.

The epidermal ridges of the fingers and palms as well as the facial structures like the lip, alveolus, teeth and palate are formed from the same embryonic tissues (ectoderm) during the same embryonic period **[18]**.

A descriptive, cross-sectional study was conducted on 233 students of Narsinhbhai Patel Dental College and Hospital. Recording of thumb print, lip print and dental caries was done by three examiners who were trained and calibrated. For recording of thumb print and lip print Cummins classification and Tsuchihashi's classification was used respectively because it is simple to apply and analyze.

In male, prevalence of loop pattern was (50%) higher among the all thumb patterns. whereas in female loop and arch pattern was (39.34%) higher in compare to whorl pattern.. In both gender, prevalence of branched groove pattern [male (42%), female (32.24%)] was higher among the study subject. Prevalence of dental caries is higher among subjects with loop pattern (67.0%) and Prevalence of dental caries is higher among subjects with branched groove pattern (71.3%).

PR Abhilash et al (2012) **[19]**, Madan et al (2011) **[20]** and Padma K. Bhat et al (2011) **[21]** conducted the studies to assess the relation between thumb print and dental caries and concluded that dental caries susceptibility of an individual increase with an increase in the incidence of whorl pattern. where as in this study subjects with loop pattern (67.0%) shows higher prevalence of dental caries. possible reason behind different in result may be due to different in fingerprint recording method, classification used to analyze the finger prints.

It was the first study to assess the correlation between lip print patterns and dental caries but it does not show any significant results. Investigation of it is in infant stage. For implication of it in clinical and basic research further study is required to draw the final conclusion.

CONCLUSION:

The Dermatoglyphics and cheiloscopy patterns may be utilized effectively to study the genetic basis of dental caries. In a developing country like India, It might prove to be a noninvasive, inexpensive and effective tool for screening. Since, Dermatoglyphics and cheiloscopy are still an inexact science at the present time, further extensive research and studies in this field have to be done in order to determine, ascertain and to evaluate the significance of these variations in the Dermatoglyphics and cheiloscopy features of patients with dental caries.

REFERENCES:

1. Tsuchihashi Y. Studies on personal identification by means of lip print. Forensic Sci. 1974; 3:233–248.
2. Suzuki K, Tsuchihashi Y. Personal identification by means of lip print. J Forensic Med. 1970; 17:52–7.
3. Saraswathi TR, Mishra G, Ranganathan K. Study of lip prints. J Forensic Dent Sci. 2009; 1:28–31.
4. Augustine J, Barpande SR, Tupkari JV. Cheiloscopy as an adjunct to forensic identification: A study of 600 individuals. J Forensic Odontostomatol. 2008; 26:44–52.
5. Gyula G. A short history and some results of the Dermatoglyphics studies in Hungary. Acta Biol Szeged.2000; 44:135–8.
6. Kucken M, Newell AC. Finger print formation. J Theor Biol. 2005; 235:71–83.
7. Cummins study of error in interpretation and formulation of Palmar Dermatoglyphics, Am J Phy Anthr 1928; 12:415-502.
8. Mathew L, Hegde AM, Rai K. Dermatoglyphics peculiarities in children with oral clefts. J Indian Soc Pedod Prev Dent 2005; 23:179-82.
9. Tyagi R,Khuller N, Sharma A, Khatri A Genetic Basis of Dental Disorders: A Review J Oral Health Comm Dent Oct 2008;2(3):55-6.
10. Tsuchihashi Studies on personal identification by means of lip prints. Forensic sci. 1974;3:233–48.
11. Cummins H.. Palmar and Plantar Epidermal Ridge Configuration (Dermatoglyphics) in Europeans and Americans.Am J Phys Anthrop. (1926); 179:741‑802.
12. Soben peter, Essentials of preventive and community dentistry, chp13- Indices in dental epidemiology, 4th edition, pg no-343-346, Arya publisher.
13. Hassel TM, et al. Genetic influences in caries and periodontal disease. Oral Biol Med 1995;6(4):319-42.
14. Nariyama M. Identification of chromosomes associated with dental caries using quantitative trait locus analysis in mice. Caries Res 2004 mar-apr;38(2):79-84
15. Blanka Schaumann, Milton Alter. Dermatoglyphics in medical disorders. NewYork, Heidel Berg, Berlin; Springer-Veriage; 1976.
16. Bixler D. Genetic aspects of dental anomalies. Chap, 6 in: Mc donald re, avery dr, editors, dentistry for the child and adolescent, St louis; Cv Mosby co; 1988. Page no: 105-6.
17. Agarwal A, importance of lip prints. Forensic files. In mystery magazine web (on line) fall. Available from http://lifeloom.com/II2Aggrawal.html.2004.
18. Sharma A, Somani R. Dermatoglyphic interpretation of dental caries and its correlation to salivary bacteria interactions; an in vivo study. J Indian Soc Pedod Prev Dent 2009; 27:17-21.
19. PR Abhilash et al. Dermatoglyphics in patients with dental caries: a study on 1250 individuals. The journal of contemporary dental practice, May-June 2012; 13(3):266-274.
20. Nidhi Madan, Arun Rathnam, Neeti Bajaj. Palmistry: A tool for dental caries prediction!. Indian Journal of Dental Research, 2011 22(2), page no: 213 – 218.
21. Padma K. Bhat, Bhumika Kamal Badiyani,Aruna C.N.,Sandhya Chengappa,Nithin N.Bhaskar, Dermatoglyphics-A New Diagnostic Tool in Detection of Dental Caries among Deaf and Mute Children. November, 2011. IJCDS**,** 2(4), page no: 80 – 84.